ART. XXXI.—*A Large Parasuchian from the Triassic of Pennsylvania*; by W. J. SINCLAIR.

Some years ago, the Geological Department of Princeton University acquired by purchase from Doctor R. S. Stahle some Parasuchian bones collected by him and Mr. R. C. Bair near York, Pennsylvania, from the red Triassic shales of the Newark group. Upon comparison, the bones prove to be referable to the form described by von Huene from the Triassic shale twenty feet below the Palisade diabase sill near Fort Lee opposite New York City, now in the American Museum of Natural History, and named by him *Rutiodon manhattanensis*. The Pennsylvania specimen, No. 11544 Princeton University Geological Museum, comprises both ilia, the left femur, the last presacral and first sacral vertebræ, an incomplete anterior caudal, the centrum of an anterior thoracic vertebra, a thoracic rib and several rib fragments, various scutes, a number of teeth and some indeterminate material. The general characters of the parts are fairly apparent from the accompanying drawings and only such as are not well shown need be described in detail.

The ilium and femur agree so closely in size and structure in the Fort Lee and York specimens that the specific identity of these two is beyond question. As pointed out by von Huene, the femur is of record size for a Parasuchian (43.44 cm. long in the Fort Lee specimen, 41½ in that from Pennsylvania), and, except for its greater curvature, resembles that of the Triassic Theropoda. The ilium is in contact with two sacral vertebræ, as shown by the articular surfaces. Of these vertebræ, only one is preserved, the anterior, seen from in front in fig. 3. The sacral ribs are completely fused with arch and centrum, although traces of suture remain. The base of the rib is expanded anteriorly and articulates with a facet on the hinder border of the centrum of the last presacral vertebra (s, figs. 2 and 3). At the distal end of the sacral rib, both anteriorly and posteriorly, there are facets for contact with the ribs of the last presacral and second sacral respectively. In the last presacral (fig. 2), unlike the condition in the smaller *Rutiodon carolinensis* as described by McGregor, the rib is firmly fused with arch

FIGS. 1-4.

and centrum and curves backward, bearing at its distal end a slightly concave facet for articulation with the first sacral rib, but, owing to crushing, the parts cannot be brought into contact in their present position. In the anterior thoracic vertebræ (not figured), the capitular facet for the rib is placed low down on, and in conjunction with, the anterior rim of the centrum. The tubercular articulation evidently arose from the neural arch, but has been broken off. The articular surfaces of the centrum are concave anteriorly, less so posteriorly. In the last presacral and anterior caudal the centra are concave in front and almost plane behind. Both surfaces of the centrum are plane in the sacral vertebra. The rib, shown in outline in fig. 11, evidently belongs in the anterior portion of the thoracic series, as the capitular and tubercular facets are widely separated.

As no teeth are associated with the type of *Rutiodon manhattanensis*, those belonging to the specimen here described are doubly interesting. They combine characters distributed among various supposedly dinosaurian genera (*Palæoctonus*, *Clepsysaurus*) described by Cope from the Triassic of Phoenixville, Pennsylvania, and as there is every reason to believe that the teeth illustrated in fig 1 belong to a single individual, probably several of the Phoenixville dinosaurs are really Parasuchians and identical with *Rutiodon manhattanensis*. If found separately, teeth of the different shapes here described might well be referred to two or more genera. Some are conical, with the surface of the enamel showing a "silky sculpture of minute raised lines" (Cope), with the base of the crown grooved longitudinally on the outer side and with serrate cutting edges extending almost to the base of the crown, separated by unequal convex surfaces (fig. 1a). In other teeth of similar shape (fig. 1b) serrations may be wanting on the cutting edges and the latter limited to the apical portion of the crown, which is finely

FIGS. 1-4. *Rutiodon manhattanensis*, No. 11544, Princeton University Geological Museum. 1a-j. Series of teeth showing some of the different forms. In all cross-sections, the lower edge of the outline corresponds to the surface of the tooth seen in the drawing. s indicates position of serrated cutting edges. 2. Last presacral vertebra from the left side. s indicates the facet for contact with the expanded base of the first sacral rib. 3. First sacral vertebra from in front. s indicates facet on expanded rib base for contact with the centrum of the last presacral. 4. Left femur from the outer side.

All figures one-third the natural size.

FIGS. 5-10. *Rutiodon manhattanensis*. 5. Left ilium from the outer side. 6. The same from below showing acetabulum (A) and facets for ischium and pubis (Is, Pb respectively). 7-10. Dermal scutes seen dorsally and from the side. 11. Outline of anterior thoracic rib.

All figures one-third natural size.

sculptured with minute raised lines and has a few broad grooves toward the base. In others (fig. 1*d*), of a type agreeing with the description of *Clepsysaurus veatleianus*, the anterior serrate cutting edge exists only on the apical portion of the crown, the posterior edge extending to its base. The crown is rounded in front, oval in cross section at the base, with enamel almost smooth to finely sculptured with raised lines. The cutting edges may be separated by very unequal convex surfaces (figs. 1*d*, 1*f*). Finally, in teeth resembling those from Phoenixville referred to *Palæoctonus*, there are serrate cutting edges both front and rear extending to the base of the crown (figs. 1*h-j*), the outer face of the crown strongly convex, the inner less so, and with the crown showing the same fine sculpturing already noted. Some teeth have a constriction between crown and fang (figs. 1*d*, 1*h*), others do not (fig. 1*c*).

A number of well preserved dermal scutes were collected with the other bones, the series illustrated in figs. 7-10 showing some of the principal types. These are both keeled and unkeeled and have the dorsal surfaces pitted with a coarse irregular sculpture.

MEASUREMENTS

Femur, greatest length	415 mm.
Ilium, length along dorsal margin	231
depth, dorsal margin to process between ischial and pubic articular surfaces	139
Sacral vertebra, greatest transverse extent across sacral ribs	230
middle of ventral surface of centrum to top of spine	212
anteroposterior diameter of spine at tip	46
length of centrum, anteroposteriorly ..	60
greatest width of expanded rib end, anteroposteriorly	69
Last presacral, middle of ventral surface of centrum to top of spine	214
anteroposterior diameter of spine at tip	47
length of centrum, anteroposteriorly ..	60
width of rib at tip (approx.)	32
Thoracic rib, capitulum to tuberculum, over all	86½
greatest diameter of shaft at middle	26

Teeth, Fig. 1*a*, length of crown above base of enamel (approx.) 31 mm.; base distorted by crushing.

Fig. 1*b*, diameters of base of crown at edge of enamel $10 \times 7\frac{1}{2}$ mm.

Fig. 1*c*, diameters of base of crown at edge of enamel $9\frac{3}{4} \times 7\frac{1}{2}$ mm.

Fig. 1*d*, diameters of base of crown at edge of enamel $14\frac{1}{2} \times 11\frac{1}{2}$ mm.

Fig. 1*f*, diameters of base of crown at edge of enamel 13×11 mm.

Fig. 1*g*, diameters of base of crown at edge of enamel 18×13 mm.

Fig. 1*h*, diameters of base of crown at edge of enamel $19\frac{1}{2} \times 11\frac{1}{2}$ mm.

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